

# Coarse Bubble Diffusers

## Bulletin Brief

Coarse bubble diffusers are widely applied and are suitable for use in a wide variety of water and wastewater applications. In fact, up until the mid 1970's, coarse bubble systems were the primary method of aerating water and wastewater systems. The technology has shifted away from coarse bubble and other moderately efficient aeration devices to high efficiency, fine bubble diffusers to a point where today fine bubble diffusers have a majority share of the aeration system marketplace.

## Technical Presentation

Coarse bubble diffusers are suitable for almost any type of water and wastewater application. The primary application of coarse bubble diffuser systems today are as indicated below:

### Aerobic Digestion Applications

Coarse bubble diffusers have been the traditional diffusers used in these applications. The standard design rate for this application is 30 scfm per 1000 ft<sup>3</sup> of tank volume.

Flexible membrane diffusers are now being installed to a significant degree due to the operating efficiency and back-flow prevention benefits of the flexible membrane product. Furthermore, the application of grid-type designs provides improved mixing. When properly applied, flexible membrane diffusers provide the end user with an ability to reduce the air rate to the digester by as much as 50% while maintaining mixing and dissolved oxygen concentrations.

### Mechanically Thickened Sludge Applications

High solids applications require aggressive aeration energy for mixing and oxygenation. Coarse bubble diffusers with back-flow prevention capabilities perform well in these applications. Diffuser units that do not have back-flow prevention capabilities should not be used in these applications as the units will mechanically plug. Flexible membrane diffusers may also be applied in high solids applications and they offer increased oxygen transfer efficiency benefits over coarse bubble diffusers.

### Auto-thermophilic Aerobic Digestion (ATAD)

These applications are high solids, high temperature applications. Coarse bubble diffusers with back-flow prevention capabilities perform well in these applications. Materials of

construction should be evaluated to handle the elevated operating temperatures associated with ATAD applications.

### **Small or Package Plant Systems**

Energy concerns are less significant for these applications and the desire for simplicity make these applications ideal for coarse bubble diffusers.

Flexible membrane diffusers are being used to a greater degree in these applications as the technology used in current state-of-the-art diffusers provides more reliability and operating efficiency.

### **Air Stripping**

Air stripping has been used for groundwater and other applications where volatile compounds are present. The high volume capacity of coarse bubble units is ideally suited for this application.

### **Summary**

Coarse bubble diffusers come in many varieties and can be simple to apply. It should be noted that all coarse bubble diffuser systems operate at approximately the same energy consumption or operating efficiency. There is little differentiation in the operating efficiency of coarse bubble diffusers when properly applied. In general, coarse bubble diffuser units require approximately 2 times the energy of high efficiency and fine pore aeration systems.

Please refer to the EDI FlexAir™, EDI PermaCap5™, and the 9-inch FlexAir Disc coarse bubble diffuser unit feature in the EDI catalog for applications where coarse bubble may be preferred.

For specific information on proper design and evaluation of your existing system contact Environmental Dynamics Inc. at 573-474-9456.